

# PROJECT WORKPLAN

(ATT#5\_LGA12\_SantaRosa\_WrkPln\_1of1)

## Background

The City of Santa Rosa (City) is located within the Santa Rosa Plain sub-basin of the Santa Rosa Valley Groundwater Basin, located at the confluence of the Santa Rosa, Bennett, and Rincon Valleys. The City's Urban Growth Boundary (UGB) overlies portions of two groundwater basins: the Santa Rosa Valley Groundwater Basin (specifically two of its sub-basins: the Santa Rosa Plain Sub-basin and the Rincon Valley Sub-basin) and the Kenwood Valley Groundwater Basin. Figure 1 shows the City's UGB and underlying groundwater basins. Although the City's UGB overlies portions of the Rincon Valley Sub-basin and the Kenwood Valley Groundwater Basin, the City's groundwater supply is derived exclusively from the Santa Rosa Plain Sub-basin of the Santa Rosa Valley Groundwater Basin. The City does not derive any groundwater supply from the Rincon Valley Sub-basin of the Kenwood Valley Groundwater Basin.

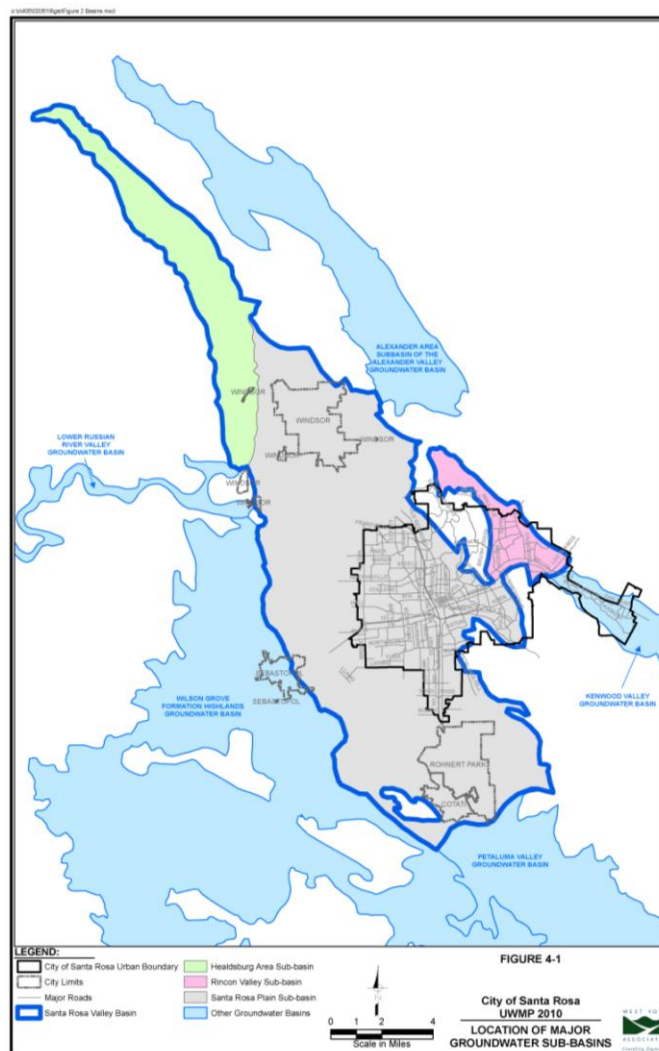


Figure 1: Location of Major Groundwater Sub-basins

Groundwater conditions beneath the City vary considerably due to the presence of the Rodgers Creek Fault Zone (which acts as a hydraulic barrier to the movement of groundwater flow) and the specific geologic conditions, however, generally speaking, the basin can be considered to be composed of the following three major water-bearing zones:

1. An upper water-bearing zone which contains unconfined water, and generally extends to a depth of about 100 to 150 feet below the ground surface;
2. An intermediate water-bearing zone which generally contains unconfined to semi-confined groundwater, which generally occurs at a depth of approximately 200 to 250 feet below ground surface; and
3. A lower water-bearing zone which is semi-confined to confined, and occurs at a depth of 400 to 500 feet, or deeper, below the ground surface.

## **Goals and Objectives**

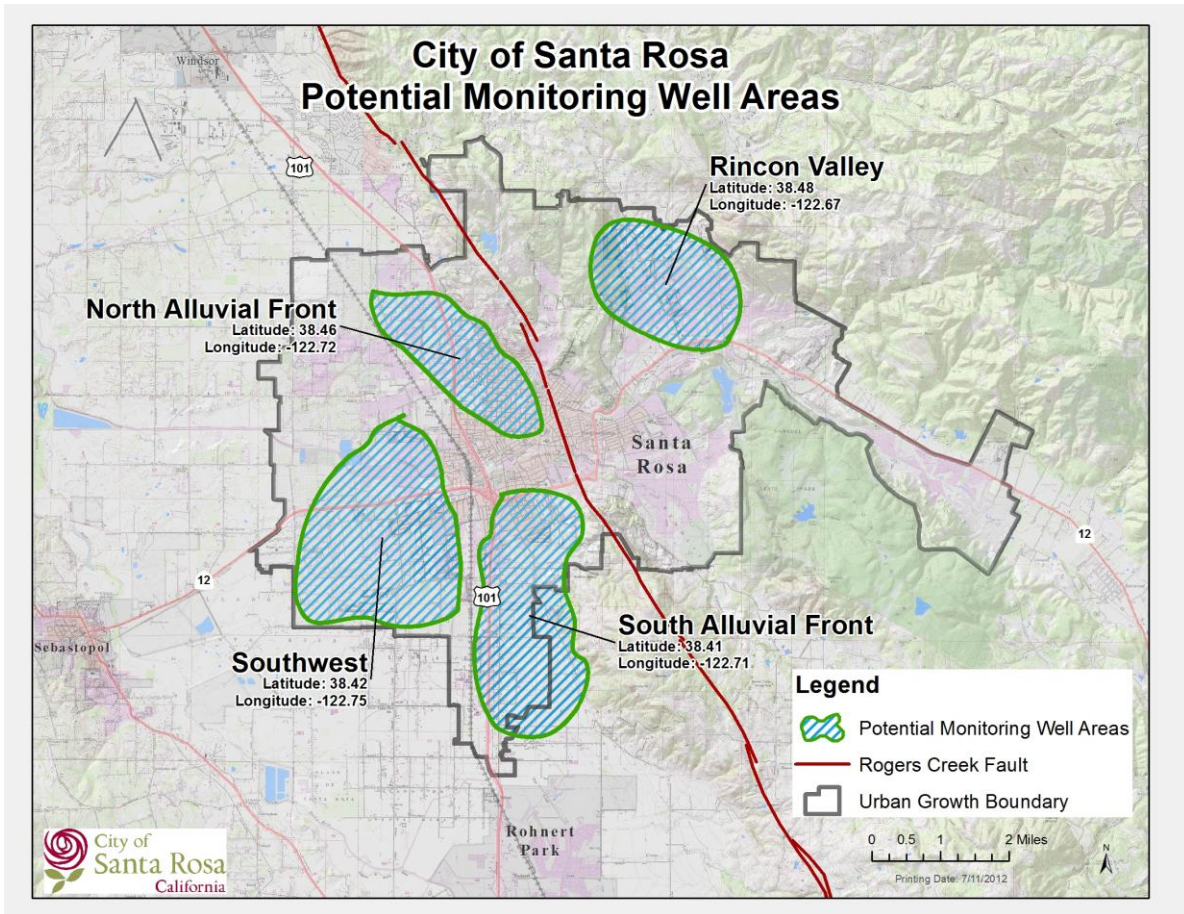
The City of Santa Rosa has a serious need for additional groundwater monitoring wells to provide water level and water quality data for a number of on-going studies and programs. This lack of site specific data is hampering the City's establishment of baseline hydrologic conditions, and will make it more difficult to identify potential impacts from the water resource management plans being discussed and the City's continued and future use of available groundwater resources.

The City has on-going groundwater programs and projects and is participating in the development of a number of regional groundwater studies that would benefit tremendously from the installation of additional groundwater monitoring wells. These programs and studies include:

- Development of the Santa Rosa Plain Sub-basin Groundwater Management Plan
- Development of the Santa Rosa Plain Sub-basin Salt and Nutrient Plan
- California Statewide Groundwater Elevation Monitoring (CASGEM) Program
- Development of the City's Groundwater Master Plan

Each of these programs and studies would benefit from the installation of additional monitoring wells in areas where data gaps have been identified.

The goal of this project is to increase the number of site specific and depth specific monitoring wells within the City's UGB to provide the City with additional information related to the groundwater basin and its response and reaction to both naturally occurring and man-created events. As part of the City's on-going work efforts to better understand the groundwater basin which it overlies, the City is preparing a Groundwater Master Plan. A task in the Groundwater Master Plan is the development of a key monitoring well network and accompanying GIS database to house the available hydrogeologic data including but not limited to the following: water level and water quality data; geologic materials encountered; drillers log and construction details; e-logs (if available); well production capacity; well efficiencies; specific capacity information and storativity and transmissivity data, if available. Figure 2 presents an illustration of the data deficient area/data gaps.



**Figure 2: Potential Monitoring Well Areas**

The hydrogeology of the Santa Rosa Plain Groundwater Basin is such that there are at least two aquifer zones; the upper zone generally occurring in the 100 to 150 foot range below ground surface, and the next lower zone occurring at a depth of approximately 250 feet. There is also the presence of a deeper aquifer, which generally occurs in the 500 to 700 foot depth range. However, due to the need to maximize the number of nested monitoring wells that can be installed with the potential DWR grant funding, only the upper and mid-level aquifer zones are being targeted in this proposal for the installation of groundwater monitoring wells.

Based on the estimated costs for drilling, construction, and development of these nested monitoring wells, it is anticipated that up to 3 monitoring well sets (nested upper and mid-level monitoring wells can be installed) at three strategically located sites, as identified on Figure 2. Each monitoring well will be 4-inches in diameter (to facilitate the insertion of a small diameter submersible pump) and have a screen zone of approximately 20 feet.

## **Scope of Work**

### **Task 1: Evaluate and Rank Potential Monitoring Well Sites**

The goal of this task is to develop a specific, prioritized list of the three most strategically located monitoring well locations which merit further investigation by the City. The Project Team (Team) will initially meet to review the City's existing key monitoring well network, and develop a listing of approximately 8 to 10 potential monitoring well site locations to evaluate. Once this listing is compiled, the Team will review the additional monitoring well needs of the various studies and programs (Santa Rosa Plain Sub-basin Groundwater Management Plan, Santa Rosa Plain Sub-basin Salt and Nutrient Plan, CASGEM Program, and the City's Groundwater Master Plan). Based on those needs, the Team will use GIS information and other available databases to review hydrogeologic, water quality, site ownership, areas of known groundwater contamination, and other pertinent data to evaluate and rank each of the proposed monitoring well sites, based on the following criteria:

- Areal and vertical extent of City's currently available key monitoring well network
- Identification of the most critical "data gap" locations
- Review of existing hydrogeologic and water quality data
- City ownership of site (existing or future City Park), or other City partner (School District, County owned or developer dedicated lands, among others)
- Proximity to areas of known soil/groundwater contamination source areas
- Site accessibility and availability of on-site area for drilling, soil cutting and generated water storage, and lay down area for casing/screen, gravel pack and other equipment

Using these evaluation criteria, the Team will apply weighting factors to each criteria, and develop a "scoring sheet" to compare each potential well drilling site. A matrix evaluation of the potential well drilling sites will be then be performed to identify those sites with the "highest" overall scores, and a recommendation of the top three sites which merit further site specific investigation to be performed as part of the test drilling program to be performed in Task 2.

**Work Product:** The work product will be a brief Technical Memorandum (TM) of the Team's findings, conclusions and recommendations identifying the top three potential monitoring well sites which should be investigated.

### **Task 2: Prepare Technical Specifications for the Recommended Test Drilling and Monitoring Well Installation Program**

Based on the results of Task 1, up to three prioritized monitoring well drilling locations will be identified. The objective of this task is to prepare Division 3, Technical Specifications, for inclusion by the City into bid documents which will allow the City to contract with a licensed C-57 Well Drilling Contractor for the required monitoring well drilling, lithologic sampling, nested monitoring well installation, well development and water quality sampling at each of the three recommended monitoring well drilling locations. The Technical Specifications will include specifications for the monitoring well drilling and lithologic sampling, monitoring well construction, well development, water quality sampling and chemical constituent analysis.

Each monitoring well site will have a 16 or 20-inch conductor casing set to a depth of 50 feet. Then a 12-inch borehole will be drilled using a direct or reverse rotary drilling method to a depth of about 500 feet. Cutting samples will be collected and bagged every 10 feet or at every change in geologic material, whichever occurs first. These samples will be examined by a licensed geologist who will then create a geologic log of the material encountered in the borehole.

Once full borehole depth has been reached, geophysical logging will be performed. It is envisioned that the following electric logs will be run: both 16 and 64 inch normal resistivity logs; SP log, gamma log, temperature, and caliper logs. Based on the results of the electric logs and cutting samples, the Project Team will make decision on the specific depths and screen locations for the nested 4-inch diameter monitoring wells. As an illustrative example, the upper monitoring well might be constructed from 0 to 130 feet with blank casing, with a 20 foot screened section specified from 130 to 150 feet. The intermediate monitoring well might be specified to have blank casing from 0 to 230 feet, with a screen section from 230 to 250 feet. An appropriately sized gravel packing will be specified based on the encountered aquifer materials and grain size distribution. In our hypothetical example, this gravel pack would be specified from the bottom of the borehole to a depth of about 200 feet; a 5 foot sand layer would then be placed from 195 to 200, and then a cement grout annular seal installed from about 160 to 195 feet. The gravel pack would then be installed from about 120 to 160 feet. Another 5 foot sand layer would be installed from 115 to 120 feet, followed by a cement grout seal from 115 feet to the ground surface.

Each monitoring well will then be developed using surging and bailing techniques to remove mud cake from the borehole wall and clean the gravel pack. A general mineral water quality sample will then be obtained from each monitoring well.

**Work Product:** The work product will be Technical Specifications for the monitoring well drilling, cuttings collection/geologic material sampling, geophysical logging, monitoring well construction, development and sampling.

### **Task 3: Services during Construction**

During the bidding period for the monitoring well drilling/monitoring well construction, the Team will attend the pre-bid conference, answer contractor questions and provide clarification related to Division 3, Technical Specifications, and prepare any required addenda related to Division 3. The Team will also attend the bid opening, summarize, evaluate, and tabulate the bids, and provide a recommendation for contractor award.

Services during construction will also be required. The Team will provide:

- Engineering office support and periodic field visits during monitoring well drilling and monitoring well construction;
- Construction administration including project coordination, change orders, progress payments, and other similar functions;
- Attend the pre-construction conference and review submittals required in Division 3 for conformance with the design concept;

- Review all submittals in conformance with the requirements of the specifications and within the time period allotted; and
- Review and respond to contractor's requests for information and clarifications during construction.

**Work Product:** At the completion of the monitoring well installations, the Team will prepare Record Drawings showing the construction details for each of the three nested monitoring wells, using the markups provided by the drilling contractor.

#### **Task 4: Evaluation of Site-Specific Hydrogeologic Data**

The Team will evaluate the lithologic, hydrogeologic and water quality data obtained during the drilling and construction of the three nested monitoring wells. This site specific data will be evaluated and added to the City's key monitoring well network and GIS database of groundwater information, to assist the City in its management of the available groundwater resources. This information will also be shared with the on-going studies and programs.

**Work Product:** The work product will be a brief TM of the Team's findings, conclusions and recommendations prioritizing the top three monitoring well sites. We will prepare a schematic graphic for each proposed nested monitoring well pairs, illustrating depth of construction, perforation zone and screen size, seal depth and/or other design details. We will also document water quality sampling results and geophysical logging for each monitoring well set.

#### **Task 5: Environmental Compliance/Permitting**

To meet California Environmental Quality Act (CEQA) requirements, the City will evaluate the environmental impacts of the Groundwater Master Plan approval at a level of detail commensurate with the level of detail provided in the Groundwater Master Plan. It is anticipated that a Mitigated Negative Declaration (MND) will be developed for the Groundwater Master Plan and that the MND will define an "envelope" or approximate/generalized area for each of the types of projects in the Groundwater Master Plan. Because the exact locations of the projects within these areas will not be known, the CEQA document will make planning-level assumptions regarding potential impacts and recommend mitigation measures based on performance standards. As future projects within the Master Plan are defined and become ready for implementation, the City would: 1) determine whether they are consistent with the Project Description for the MND and fit within the "envelope" defined for each type of project; 2) determine whether they are located within one of the geographic areas evaluated in the MND; and 3) apply the mitigation measures.

It is anticipated that this project will reference the Groundwater Master Plan MND and conduct any needed site-specific surveys, such as biological surveys, for the specific locations identified for the monitoring wells.

**Work Product:** The work product will be a review of the MND to determine if the project is consistent with the MND, apply any identified mitigation measures, and determination of any needed site specific surveys. If needed, site specific surveys will be conducted.